

# Ministat® 240

**Ministat® 240 cycling a 5-litres glass vacuum insulated reactor**

**Requirement**

This Case Study demonstrates the temperature control capabilities of the process temperature and also the minimum achievable process temperature when a Ministat 240 is connected with a 5-liter Asahi glass vacuum insulated reactor.

**Method**

The 5-litres Asahi glass vacuum insulated reactor was connected to Ministat® 240 using 1-meter metal insulated hoses. The thermofluid used in the system was "M60.115/200.05". "Process" control was carried out via a Pt100 sensor located in the "process" mass. Stirrer speed was set to 150 rpm.

**Setup details**

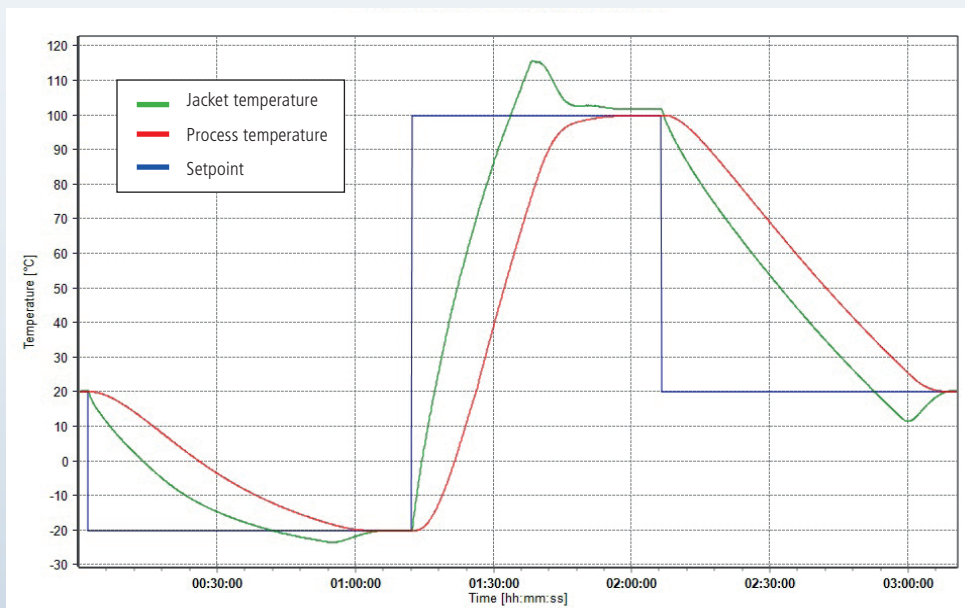
- Temperature range: -45°C...+200°C
- Cooling power: 0.60 kW @ +20°C  
0.55 kW @ 0°C  
0.35 kW @ -20°C
- Heating power: 2.0 kW
- Hoses: 2\*1 m metal insulated
- HTF: M60.115/200.05
- Reactor: Asahi 5-litres glass vacuum insulated
- Reactor content: 4 l M60.115/200.05
- Stirrer speed: 150 rpm
- Control: process
- Amb. temperature: +25°C



**Results**

**1. Performance:**

The graphic shows the tight and rapid control as the Ministat 240 ramps to each new set-point. The Ministat® 240 needs 57 minutes to cool down the reactor from +20°C to -20°C, then 52 minutes to heat up the reactor from -20°C to +100°C and 64 minutes to cool down the reactor from +100°C to +20°C.



## 2. Lowest achievable temperature (Tmin):

Once stable at +20°C under the "Process" control, a set point of -40°C is entered. The graphic shows that the lowest temperature achieved in a 1-liter Chemglass jacketed reactor was -29.6°C.

